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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/751,235	12/30/2000	Alan Wong	042390P10057	8761

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EXAMINER

RHEE, JANE J

ART UNIT

PAPER NUMBER

1772

DATE MAILED: 07/30/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/751,235

Applicant(s)

WONG, ALAN

Examiner

Jane J Rhee

Art Unit

1772

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/16/03 has been entered.

Repeated Rejections

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

1. Claims 1-5 and 12 are rejected under 35 U.S.C. 102(e) as being unpatentable by Hijzen et al. (6368921).

Hijzen et al. discloses a structure comprising a first pair of features disposed in a substrate and left exposed (figure 9 number 51 and 10a), the first pair of features being equidistant from the first centerline; a second pair of features disposed in the substrate and left embedded below a layer of material (figure 9 number 17), the second pair of features being equidistant from a second centerline; and a third pair of features disposed in the layer of material (figure 9 number 17), the third pair of features being equidistant from a third centerline, wherein deviation among the first, second, and third centerlines is a measurement of overlay. Hijzen et al. discloses that the first separation between the first centerline and the third centerline is a post-etch overlay (figure 9). Hijzen et al. discloses that the second separation between the second centerline and the third centerline is a post develop overlay (figure 9). Hijzen et al. discloses that the third separation between the first centerline and the second centerline is an exposed to embedded offset in overlay (figure 9). Hijzen et al. discloses that the exposed to embedded offset in overlay can correct a post develop overlay to predict a post etch overlay (figure 9). Hijzen et al. discloses that the first pair, the second pair, and the third pair of features are parallel (figure 9 number 51 and 17).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5 and 12 is rejected under 35 U.S.C. 102(b) as being unpatentable by Morikawa (5308682).

Morikawa discloses a structure comprising a first pair of features disposed in a substrate and left exposed (figure 4c number 39a), the first pair of features being equidistant from the first centerline; a second pair of features disposed in the substrate and left embedded below a layer of material (figure 4c number 37a and 37b), the second pair of features being equidistant from a second centerline; and a third pair of features disposed in the layer of material (figure 4c number 37c and 37d), the third pair of features being equidistant from a third centerline, wherein deviation among the first, second, and third centerlines is a measurement of overlay. Morikawa discloses that the first separation between the first centerline and the third centerline is a post-etch overlay (figure 4c). Morikawa discloses that the second separation between the second centerline and the third centerline is a post develop overlay (figure 4c). Morikawa discloses that the third separation between the first centerline and the second centerline is an exposed to embedded offset in overlay (figure 4c). Morikawa discloses that the exposed to embedded offset in overlay can correct a post develop overlay to predict a post etch overlay (figure 4c). Morikawa discloses that the first pair, the second pair, and the third pair of features are parallel (figure 4c numbers 39 and 37a,b,c,d).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hijzen et al. in view of Farrar (6413827).

Hijzen discloses that the first pair of features and the second pair of features comprises trenches (figure 9 number 17). Hijzen discloses that the third layer is transparent (figure 2 number 52). Hijzen fail to disclose that the trenches are filled with dielectric material. Hijzen fail to disclose that the second pair of features are trenches filled with dielectric material and covered with transparent material. Farrar teaches trenches filled with the dielectric material, silicon dioxide for the purpose of obtaining improved values of capacitive coupling (col. 2 lines 48-50). Silicon dioxide is notoriously well known in the art to be a transparent material.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have provided Hijzen with trenches filled with the dielectric material, silicon dioxide in order to obtain improved values of capacitive coupling (col. 2 lines 48-50).

4. Claims 9-11 rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa in view of Bostrom (3731085).

Morikawa discloses the structure above. Morikawa fail to disclose that the first, second or third features comprise holes filled with opaque material. Bostrom discloses

holes filled with opaque material for the purpose of forming a code to impart evidence of identification (col. 1 line 66).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have provided Morikawa with holes filled with opaque material in order to form a code to impart evidence of identification (col. 1 line 66) as taught by Bostrom.

5. Claims 1-3,6, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art (figure 1 and 2 and pg 2-4).

Applicant's admitted prior art discloses a first pair of overlay bars disposed in a substrate and left exposed, the first pair of overlay bars being equidistant from a first centerline (figure 1 number 45 and 52), a second pair of overlay bars disposed in the substrate and left embedded below a layer of material, the second pair of overlay bars being equidistant from a second centerline (figure 1 number 15,14 and 40) wherein the overlay bars are trenches filled with dielectric material (pg 3 lines 18-19). Applicant's admitted prior art discloses that the first and second pairs are parallel (figure 1 numbers 15 and 45). Applicant's admitted prior art fails to disclose a third pair of overlay bars disposed in the layer of material, the third pair of overlay bars being equidistant from a third centerline.

However, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have provided a third pair of overlay bars disposed in the layer of material in order to have provided a simpler overlay measurement system

wherein one is able to measure the overlay after develop and after etch more consistently.

Response to Arguments

6. Applicant's arguments filed 5/16/03 have been fully considered but they are not persuasive.

In response to applicant's argument that Hijzen et al. and Morikawa teaches that the cells/features are all the same and that Hijzen et al. or Morikawa does not teach any pair of features, Examiner would like to point out that since Hijzen et al. teaches hundreds of cells that are electrically parallel, any two cells can be picked out and be labeled as a pair of features as pointed out by the Examiner. Applicant argues that in figure 9 of Morikawa's patent, 37a, 37b, 37c, 37d are all identical to each other, however, the second and third pair of features obtain no differential characteristics since the substrate wherein the second pair of features is disposed in and the layer of material that the second pair of features are left embedded below of and the third pair of features are disposed in are not differentiated from one another, therefore, the substrate and the layer of material can be made of the same material.

In response to applicant's argument that Hijzen et al. describes the structure in figure 9 as being formed with a self aligned process, it does not matter what process Hijzen et al. used to form the structure in figure 9 because the overlay can be calculated by choosing any two pairs of features in figure 9 and taking the difference between two centerlines. Hijzen et al. discloses first and second features wherein both features inherently possess centerlines therefore, the difference between the first centerline and

the second centerline would calculate the post develop overlay. The post etch overlay is understood as the difference between the centerline of the first feature and the centerline of the third feature. Hijzen et al. teaches a first and third pair of features wherein both pair of features inherently possess centerlines therefore difference between the first and third centerlines would calculate the post etch overlay. The exposed to embedded overlay offset is understood as the difference between the overlay for the post etch condition and the overlay for the post develop condition. Also the offset of the exposed embedded overlay is understood to be able to be used to correct subsequent measurements of overlay after develop.

In response to applicant's argument that Morikawa teaches vernier scale patterns that serve as an alignment check pattern for multilevel interconnection of at least three levels, it does not matter that Morikawa's features serve as an alignment check pattern for multilevel interconnections of at least three levels because the overlay can be calculated by choosing any two pairs of features in figure 4c and taking the difference between two centerlines. Morikawa discloses first and second features wherein both features inherently possess centerlines therefore, the difference between the first centerline and the second centerline would calculate the post develop overlay. The post etch overlay is understood as the difference between the centerline of the first feature and the centerline of the third feature. Morikawa teaches a first and third pair of features wherein both pair of features inherently possess centerlines therefore difference between the first and third centerlines would calculate the post etch overlay. The exposed to embedded overlay offset is understood as the difference between the

overlay for the post etch condition and the overlay for the post develop condition. Also the offset of the exposed embedded overlay is understood to be able to be used to correct subsequent measurements of overlay after develop.

Conclusion

This is a continuation of applicant's earlier Application No. 09751235. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jane J Rhee whose telephone number is 703-605-4959. The examiner can normally be reached on M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 703-308-4251. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Jane Rhee
July 28, 2003



ALEXANDER S. THOMAS
PRIMARY EXAMINER